

engineering specification
CATALOG NO. S-310
stack switches

GENERAL PURPOSE STACK SWITCHES

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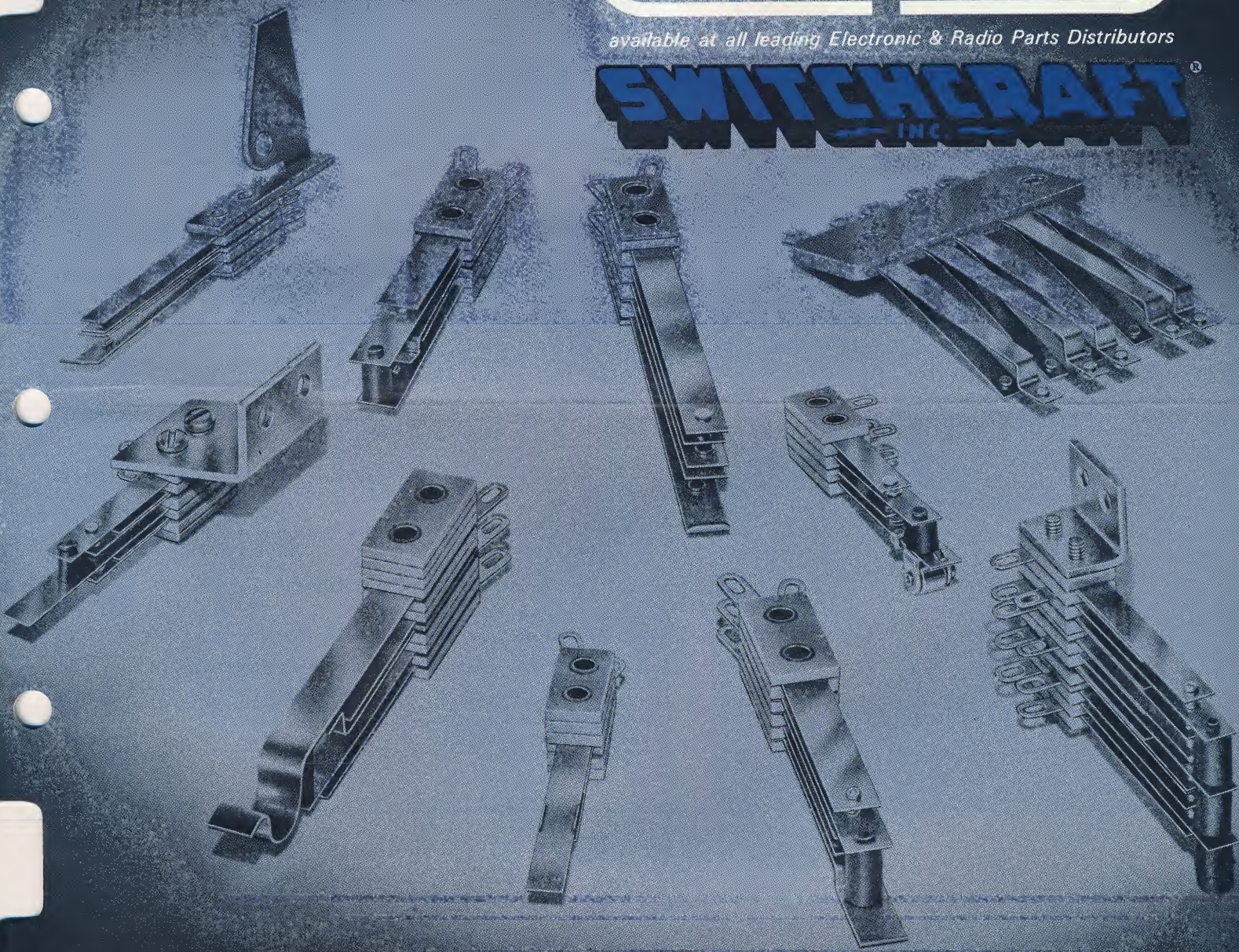
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This Catalog Supersedes Catalog S-308

available at all leading Electronic & Radio Parts Distributors

SWITCHCRAFT
INC.



for details contact:

GENERAL PURPOSE STACK SWITCHES

STANDARD ASSEMBLIES

Complete general purpose stack switch assemblies made from a pile-up of various actuator springs, contact springs and lifters. These stack switch assemblies can be used on manually operated control devices where switching is operated by cams, levers, push-buttons and other similar mechanical devices.

These Standard Assemblies are available with a "Flat" or a "V" formed actuator spring which engages the mechanical operating device. The actuator spring and contact springs are made of tempered nickel silver. The actuator spring, as with the contact springs, is a current carrying member of the assembly. Therefore consideration should be given to the choice of materials used in the mechanical actuating device. An insulating material such as fibre, plastic or phenolic is recommended.

Fine silver or palladium cross-bar welded contacts are standard; rated at 3 amperes, 300 watts max., A.C. non-inductive load.

The stack switch assembly is made up of an actuator spring and various contact springs. These current carrying members are insulated from each other by phenolic spacers with plastic tubing press fitted through the stack; thereby insuring correct alignment of contacts and providing high insulation resistance when mounted.

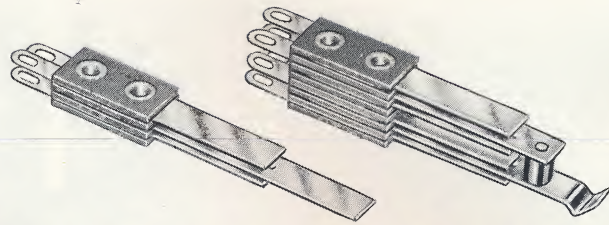
The stack switch assemblies, because of their long length and narrow width, may be mounted on 3/8" centers. A pressure plate (S-1293), and two # 5-40 screws for 3/8" center mounting are furnished with each standard Stack Switch. A Twin Nut (S-1008), is also available; but must be ordered separately if needed. See drawings on Pages 4 and 5.

The Standard Stack Switch Assemblies as listed on this page have been designed and adjusted for a nominal throw of 1/8".

Detailed drawings on Pages 4 through 7 furnish complete information on various stack switch components in 3/8", 1/4" and 3/16" mounting centers. Experimental "Stack Switch Kits" to aid the engineer in designing an assembly to meet a particular requirement, are shown on Page 8.

Special circuits, spring configurations, types of blades and contacts can be furnished on special order. Refer to Basic Contact Forms illustrated below; specify the circuits needed by referring to the letter identification.

BASIC CONTACT FORMS



"FLAT" ACTUATOR SPRING

PART NO.	U.S.A. LIST PRICE	CONTACT MATERIAL	DIM. "X" MAX.	CONTACT ASSEMBLY
AA01AA	\$.70	Silver	25/64"	1-A
AA01AB	.80	Palladium	21/64"	1-A
AA02AA	.70	Silver	21/64"	1-B
AA02AB	.80	Palladium	19/64"	1-B
AA03AA	.90	Silver	27/64"	1-C
AA03AB	1.10	Palladium	23/64"	1-C
AA06AA	1.25	Silver	45/64"	2-C
AA06AB	1.55	Palladium	37/64"	2-C

"V" FORMED ACTUATOR SPRING

AA01BA	\$.80	Silver	25/64"	1-A
AA01BB	.90	Palladium	21/64"	1-A
AA02BA	.80	Silver	21/64"	1-B
AA02BB	.90	Palladium	19/64"	1-B
AA03BA	1.00	Silver	27/64"	1-C
AA03BB	1.20	Palladium	23/64"	1-C
AA06BA	1.45	Silver	45/64"	2-C
AA06BB	1.65	Palladium	37/64"	2-C

Packed 10 Per Standard Package

SPECIFICATIONS

SPRINGS: Tempered Nickel Silver.

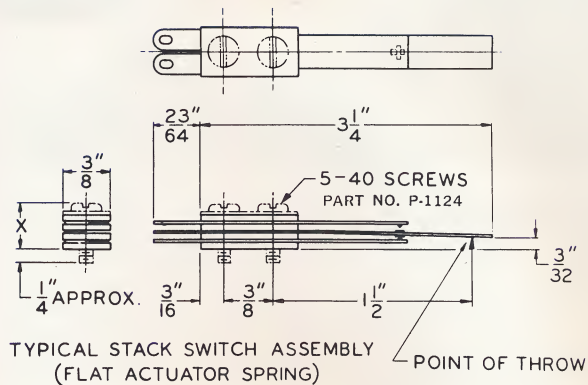
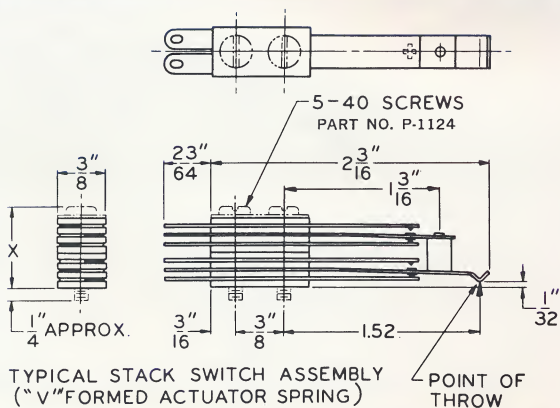
CONTACTS: Fine silver contacts or Palladium Cross Bar welded contacts.

INSULATION: XXXP Paper Base Phenolic. Plastic tubing through stack assembly.

LIFTERS: Machined fibre.

TERMINALS: Solder type, hot tin dipped.

SCREWS AND PRESSURE PLATE: Steel, iridescent iridite over Cadmium plating.



VERSATILE • DEPENDABLE • ECONOMICAL

In addition to the General Purpose Stack Switch Assemblies, Switchcraft offers various stack switch components. These components consist of contact springs, spacers, lifters, etc., in varied lengths, thicknesses, mounting centers and other details.

These components are not sold separately as piece parts, but are assembled into innumerable different stack switch assemblies. In the photograph on page 1 of this catalog are 9 typical stack switch assemblies being made to customer's blueprints.

It is impossible to catalogue all the many different types that have been manufactured, therefore, detailed drawings of the

various stack switch components have been prepared and appear on Pages 4, 5, 6, and 7. Springs are shown in full scale and are maximum length. To aid your preparation of engineering drawings, please refer to "Switch Design Suggestions" which is presented on Page 7. Use this guide as an engineering or procurement "Check List." To speed your design of stack switch engineering samples, experimental "Stack Switch Kits" can be purchased. See Page 8.

Stack Assemblies can often be designed to meet U/L requirements, however, cannot be approved separately—only as part of equipment.

STACK SWITCH DESIGN SPECIFICATIONS

SPRINGS

Spring tempered nickel silver (phosphor bronze used as an alternate), in most standard gauge thicknesses ranging from .0063" to .020"; a few designs can be made up to .031" thick. All or any contact point hole can be provided; spring can be cut at any point.



BRACKETS

Standard brackets are detailed. Tools are flexible so that various lengths from same width stock can be provided.



LIFTERS OR PUSHERS

3/16" diameter fibre in various lengths staked into one of the contact point holes provides tandem action between blades or to serve as an actuator. A punched phenolic lifter can be furnished (S-1002).



MOUNTING HARDWARE

Pressure plates (S-1293 and S-2300) and twin nuts (S-1008 and S-1431) and screws available for mounting.



LEAF INSULATORS

Punched in same shape as springs in .015" thickness of Fish Paper (Paper Base Phenolic also available).



SPACERS

Type XXP paper base phenolic is standard in thicknesses of .032", .047", .063" and .093"; can also be made using type XXXP (MIL type PBE-P) paper base phenolic. For applications requiring longer surface creepage paths, stack design should use both large and standard sized spacers. High temperature insulations are also available.



TUBING

Polystyrene and bakelite (hard rubber used as an alternate) tubing passes a #5 screw in 3/8" mounting center design; passes a #3 screw in 1/4" mounting center type; passes a #2 screw in 3/16" mounting center type. Paper base phenolic tubing available. High temperature tubing is also available.



CAM FOLLOWERS

Two roller bracket designs (G-1734 and G-2298) available for springs 1/4" wide. Roller diameters shown, nickel plated brass, are standard—can be furnished in other diameters and materials. Nylon rollers also available.



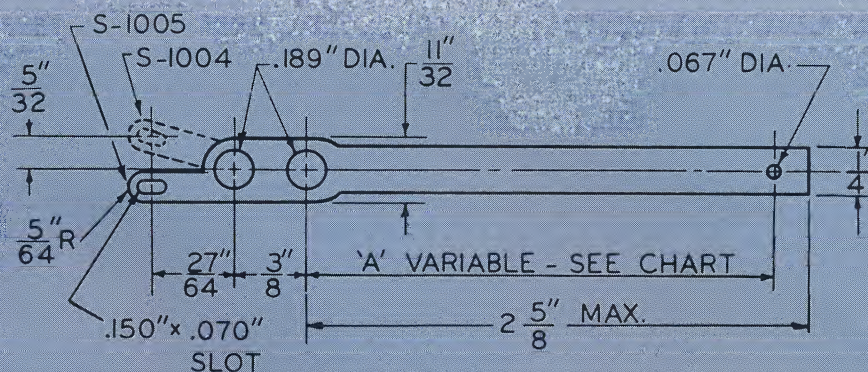
CONTACTS

Fine silver contacts are most commonly used; available in 3/32", 1/8", 3/16", and 1/4" diameters. The size required depends on circuit requirements—furnish complete details. Also available with welded cross-bar Palladium, gold alloyed or gold plated fine silver contacts for low level audio circuits. Springs can be bifurcated providing two contacts per spring.



3/8" Mounting Centers— 1/4" Wide Switch Parts

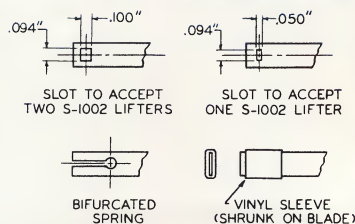
Numerous forms of Spring Blades are available as noted in the photographs of Stacks on page 1, but requirements are of such a variable nature that cataloging is impractical. In most instances standard tools would be used; otherwise, various special forms are available at low cost.



Standard	17/32	7/8	1-11/16	Others available on special order.
Hole Locations	23/32	1-5/32	2-3/16	
Available	25/32	1-7/32	2-7/16	
	31/32	1-7/16		

A

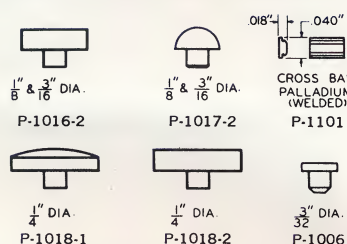
SCALE 1/2



SCALE 1/2

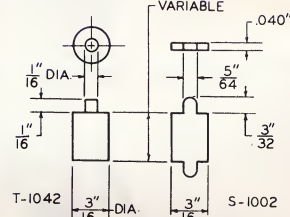


SCALE 2/1



Contact requirements variable and contingent on current and voltage switching requirements. Furnish complete details. See Contact copy Page 3.

Technical drawing of a full-scale model of a turbine component. The drawing shows a cross-section of a shaft with a central hole. Dimensions include a diameter of $\frac{3}{16}$ inches, a length of 5 inches, a thickness of $\frac{3}{32}$ inches, and a variable dimension of .040 inches. The material is labeled S-1002.



5" 1/16

#5-40 THD

3" 1/16

3" 8

3" 4

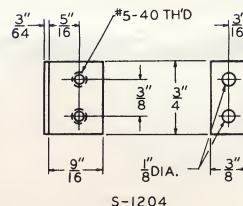
9" 1/16

1" 8 DIA.

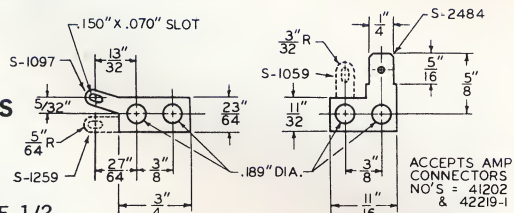
3" 8

S-1204

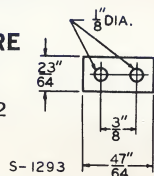
SCALE 1/2



SCALE 1/2



SCALE 1/2



TWIN NUT

2 1/8"

3/8"

#5-40 TH'D

9/32"

S-1008

SCALE 1/2"

[illegible]

Part No. P-1124, #5-40 screws for 3/8" center mounting contact springs.
1/8" to 1-1/2" in 1/16" increments.

1/4" Mounting Centers— 3/16" Wide Switch Parts

Standard	1/2	7/8	1-9/32	1-15/16
Hole Locations	17/32	31/32	1-3/8	1-61/64
Available	19/32	1-3/32	1-7/16	
'A'	3/4	1-7/32	1-11/16	

Technical drawings of two pump models, S-1430 and S-1514, showing their dimensions. Both pumps have a 5 5/32 inch diameter and a 4 inch width. The S-1430 has a total height of 9 1/16 inches and a mounting flange height of 19 5/8 inches. The S-1514 has a total height of 7 1/16 inches and a mounting flange height of 7 1/16 inches.

PRESSURE PLATE

SCALE 1/2

S-2300

SCALE 1/2

#3-4

19"

64

1"

4

9"

16

S-1431

SCALE 1/2

[illegible]

FLAG SPRING

.158" DIA.
 .067" DIA.
 3/16"
 1/4"
 1/4"
 19/32"
 27/32"
 3/32"
 3/32"
 S-2360
 SCALE 1/2

SCALE 1/2

Technical drawing of a mechanical part, labeled S-1758. The drawing shows a side view of a component with a central rectangular body and two angled end sections. Key dimensions are provided: overall width is 13 inches (13 3/32 inches), overall height is 9 inches (9 1/16 inches). The central body has a width of 4 inches and a height of 4 inches. The end sections are angled, with a top width of 3 inches (3 3/64 inches) and a bottom width of 2 1/64 inches. The central body has two circular holes, each with a diameter of 1/8 inch. The end sections have two circular holes each, with a diameter of 1/8 inch. The part is labeled #3-48 TH'D. and S-1758.

SCALE 1/2

SPRING MODIFICATIONS

SCALE 1/2

G-2298

G-1734

LIFTERS

FULL SCALE

5

TELEPHONE RELAY TYPE STACK SWITCHES

Switchcraft now makes available the well accepted and generally standardized design of telephone relay type stack switch blades together with Switchcraft's already available associated components.

The design permits a more compact (lengthwise) stack switch assembly that is particularly suitable for low activating force requirements as generally encountered in relay and magnetic operated devices. Various basic contact forms are illustrated below. Other "pile-ups" can be assembled to your specifications.

TELEPHONE RELAY TYPE STACK SWITCH DESIGN SPECIFICATIONS

SPRINGS: Spring tempered nickel silver, in thickness ranging from .0063" to .016".

SPACERS: Type XXXP paper base phenolic is standard in thickness of 1/32", 3/64", and 1/16".

CONTACTS: Fine silver or welded cross-bar Palladium are standard. Palladium contacts are generally recommended for "Dry" circuit applications. Other contacts available for varied customer requirements on special order.

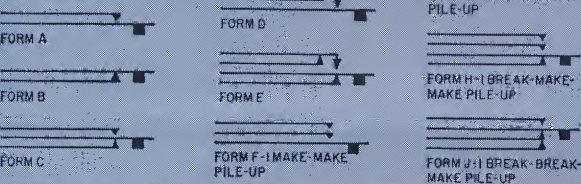
TUBING: Polystyrene or bakelite.

LIFTERS: Fibre, in various lengths.

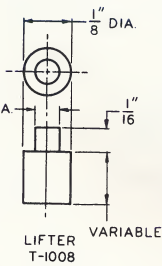
BRACKET: Steel, Cadmium Plated.

MOUNTING: Pressure Plate, Twin Nut and Screws—Steel—
HARDWARE: iridescent iridite finish over cadmium plating.

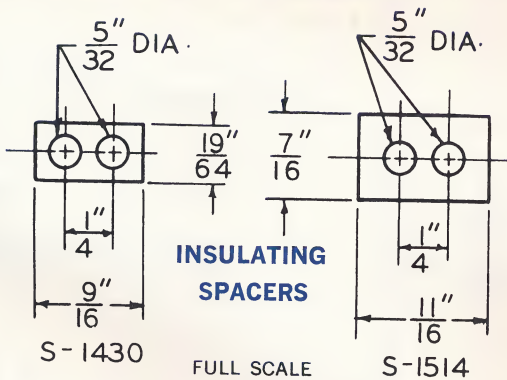
BASIC CONTACT FORMS



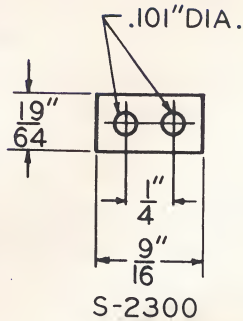
LIFTERS



SCALE 2/1

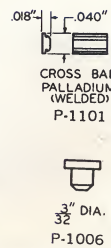


PRESSURE PLATE

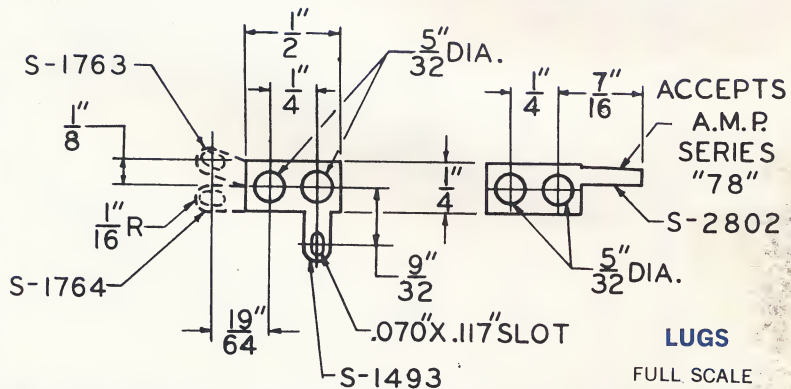


FULL SCALE

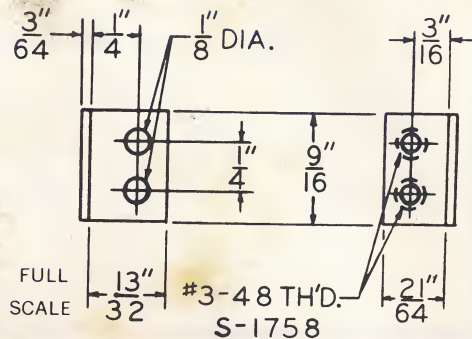
CONTACT

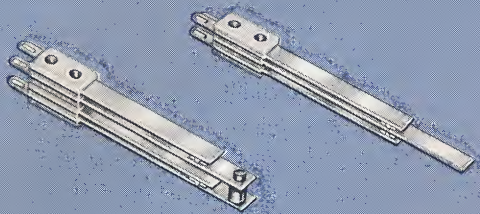


SCALE 2/1



BRACKET





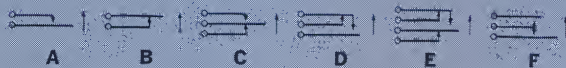
"TINI-STACK" SWITCH COMPONENTS

"TINI-STACK" SWITCH COMPONENTS

3/16" Mounting Centers 5/32" Wide Switch Parts

These parts are shown for engineering design reference only; not sold separately as parts.

BASIC CONTACT FORMS



Now, tiny stack switch assemblies consisting of a "pile-up" of various miniature springs, insulators, plates, etc., are available. These new "Tini-Stack Switch" assemblies are ideal for use on today's scaled-down electronic equipment.

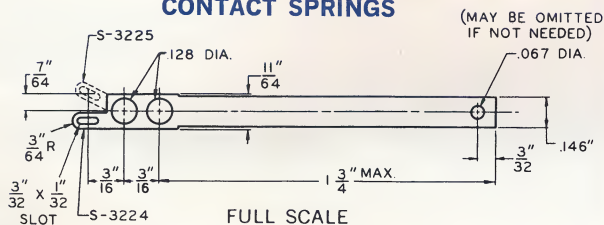
In the photograph are 2 typical "Tini-Stack Switches." However, other "pile-ups" are available in innumerable different arrangements.

Listed in the table to the left are various basic contact forms. Other arrangements can be assembled to your specifications.

"TINI-STACK" SWITCH DESIGN SPECIFICATIONS

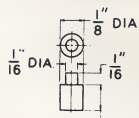
- SPRINGS:** Spring tempered nickel silver, in most standard gauge thicknesses ranging from .006" to .016".
- SPACERS:** Type XXXP paper base phenolic, available in thickness of 1/64", 1/32" and 3/64".
- CONTACTS:** Riveted fine silver or welded fine silver and cross bar welded Palladium. Rated at 3 amperes, 300 watts, A.C., non-inductive load. Palladium generally recommended for "dry" circuit applications.
- TUBING:** Polystyrene or bakelite.
- LIFTERS:** Machined fibre.
- MOUNTING HARDWARE:** Pressure Plate, Twin-Nut, and Screws—Steel, iridescent iridite finish over cadmium plating.

CONTACT SPRINGS



FULL SCALE

LIFTERS



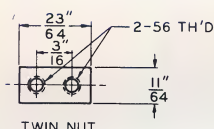
Lifter
T-1008
FULL SCALE

CONTACT



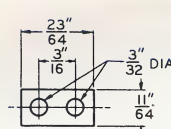
SCALE
2/1

TWIN NUT



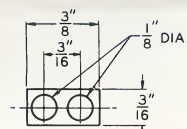
TWIN NUT
S-3251,
FULL SCALE

PRESSURE PLATE



PRESSURE PLATE
S-3228
FULL SCALE

SPACER

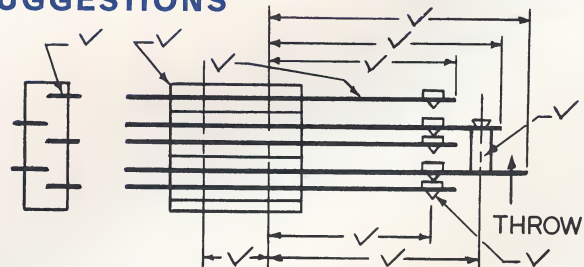


SPACER
P-1665
FULL SCALE

"SWITCH DESIGN SUGGESTIONS"

Careful consideration of the following will result in the most economical design and expeditious approach to your switching needs.

- On initial inquiry or order furnish the following information:
 1. Simple sketch or drawing. See suggested sketch at right. Furnish details checked that are variable.
 2. Current, voltage and type of load to be switched (resistive or inductive).
 3. Frequency of operation. Life requirement.
 4. Details of actuator to be used.
 5. Max. and Min. movement of actuator blade.
 6. Any other important details of intended use.
- Select insulating spacer thicknesses to minimize bending and/or adjusting of contact blades.
- Use at least 1/16" thick spacers for outer components of stack. Usually eliminates need for "Rubber Banding," bolting, etc., to keep stack together prior to final mounting.



TYPICAL STACK ASSEMBLY
(SEE COPY)

- If contact spring is, by necessity, outer component of stack, consider 1/16" thick metal spacer to keep stack together.

... It is recommended that before finalizing your design that sketch and data indicated above be forwarded to us for comments and recommendations.

NOTE—Samples can be readily fabricated from "Stack Switch Kits" listed on Pages 7, 8.

"STACK SWITCH KITS"

- DESIGN • FIELD REPAIR • REPLACEMENT
- ENGINEERING SAMPLES

Experimental Kits consist of the most popular springs, insulators, etc., shown on pages 4, 5 and 7 of this catalog. Ideal for Project Engineers in making working samples during design stages. Suitable for field repairs or replacements.

Kit No. K-101 is especially recommended for the design engineer who has not decided which spring design would be most suitable for his project.

Kit Nos. K-102, K-103 and K-119 contain springs of only one type. See description below.

***We recommend that you order this item from the SWITCHCRAFT Distributor nearest you.**



STACK SWITCH EXPERIMENTAL KITS*

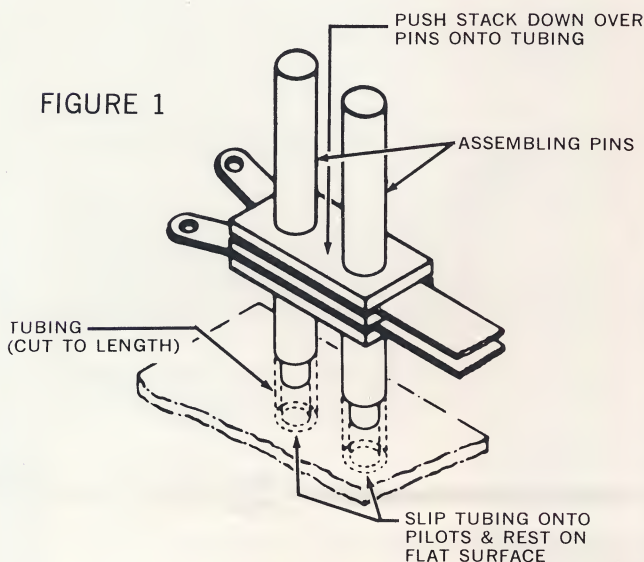
(Packed in clear plastic case)

PART NO. K-101 Assorted 1/4" and 3/8" mounting center contact springs and associated parts.	Your Net Cost \$9.90 each
PART NO. K-102 Assorted 1/4" mounting center contact springs and associated parts.	\$9.90 each
PART NO. K-103 Assorted 3/8" mounting center contact springs and associated parts.	\$9.90 each
PART NO. K-119 "TINI-STACK" SWITCH KIT Assorted 3/16" mounting center contact springs and associated parts.	\$9.90 each

NEW

SWITCHCRAFT STACK KIT ASSEMBLY INSTRUCTIONS

Two sets of stack assembling pins (2 to each set) are furnished with each SWITCHCRAFT Stack Kit No. K-101. The larger set of pins are used to assemble switch leaves and insulating spacers having mounting centers of $\frac{3}{8}$ ", while the smaller set are used for assembling the $\frac{1}{4}$ " center leaves and spacers. Appropriate pins are included in Kits No. K-102, K-103 and K-119.



NOTE: PINS ARE READILY USED TO REMOVE TUBING FROM STACK BY SIMPLY REVERSING PROCEDURE ABOVE.

1. Assemble stack on pins, as indicated in Fig. 1, after having fabricated each switch leaf to desired configuration.
2. Pinch stack tightly and use as Gauge to cut tubing (2 Req'd) to length. (Tubing should be from $\frac{1}{64}$ " to $\frac{1}{32}$ " shorter than overall height of stack pile-up.)
3. To insert tubing into stack: simply slip tubing, (cut to length) onto pilots, place on flat surface and push stack down over pilots onto tubing, as shown in Fig. 1.



4. Pressure plates (metal plates of same rectangular dimensions as insulating spacers) are furnished and should be used as top member of stack just under screw head as indicated in Fig. 2—typical stack assembly.
5. Roller assemblies are included in each switch kit, except K-119. (To fit 3/8" mounting center leaves.) Assemble to switch leaf as shown in Fig. 3. May also be adapted for use on 1/4" Center Contact Springs. Use in applications where "long-life actuator" is desired.

FIGURE 2
TYPICAL STACK ASS'Y
"EXPLODED VIEW"

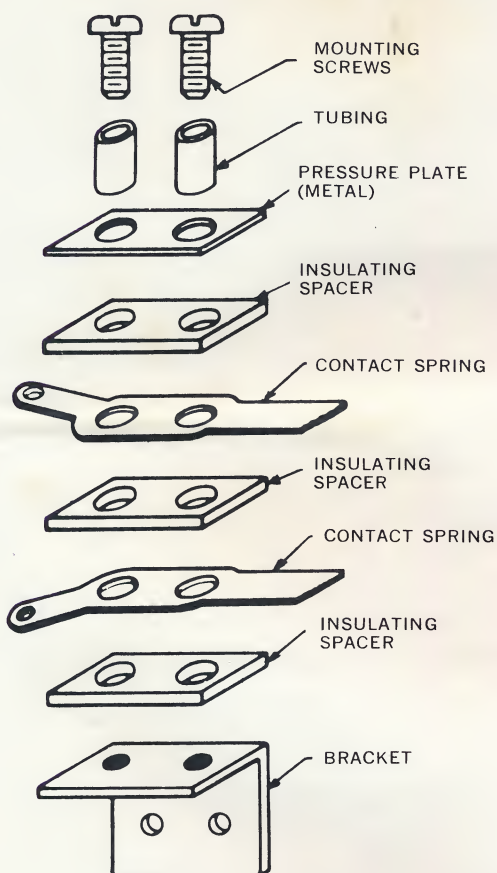
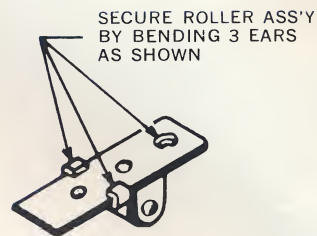


FIGURE 3
ROLLER ASSEMBLY



6. All contacts furnished are fine silver and may be fastened to switch leaves as shown in Fig. 4.

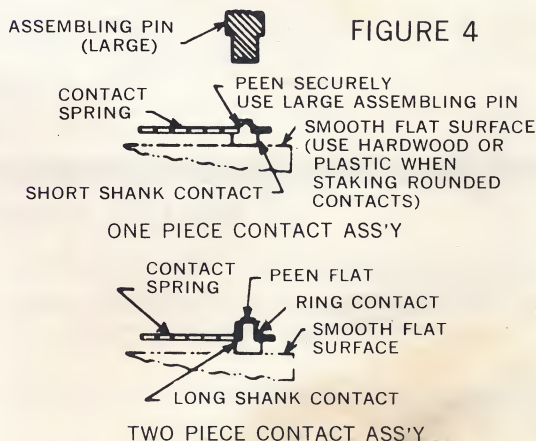
The 3/32" dia. contacts can be and usually are coined to a "point" when staking into contact leaf. It is desirable to have a "point" or "radius surface" on one contact leaf mating with a flat contact surface on adjacent leaf in stack.

"TINI-STACK" spring leaves, in K-119, have a single .067" dia. hole, 3/32" from tip of standard length spring, for mounting riveted silver contacts. If shorter spring leaves are required for a "TINI-STACK" pile-up, it will be necessary to punch .067" dia. holes in springs to mount the contacts.

The "assembly pins" are designed to be used as a staking punch that will give the desired "point" configuration. See Fig. 4.

7. Round stack lifters are fibre and may be peened to contact leaf similar to Fig. 4. Flat lifters are used in S-1000 and S-1006 type contact leaves and are held in place by tension of leaves only.

NOTE:—When bending or forming switch leaves—leave small radius inside bends to avoid undue fracturing of material.



SWITCHCRAFT
INC.

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We reserve the right to change the prices, specifications and/or part numbers contained herein when circumstances make it necessary.